



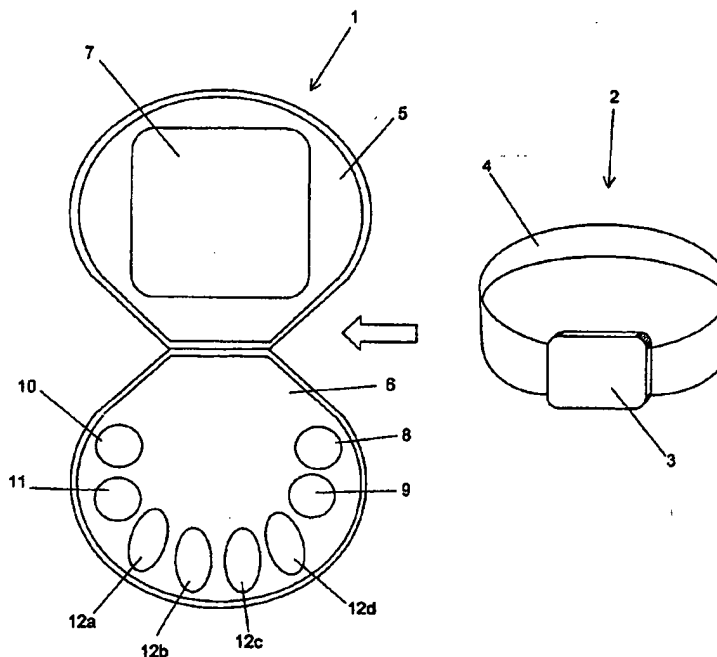
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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**(54) Title:** A DEVICE ARRANGED TO ENABLE SUPERVISION OF THE NUTRITIONAL BALANCE OF A USER

**(57) Abstract**

The present invention relates to a device arranged to enable supervision of the nutritional balance of a user, wherein the device is arranged to calculate said nutritional balance by means of information related to at least one body measure of the user, the ingested nutritional quantity of the user and the physical activity of the user. The device comprises a measuring unit (3) which is arranged to enable measuring of at least one parameter related to the physical activity of the user and in that the device is arranged to calculate and inform the user of the actual nutritional balance at a desired point of time.



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**A device arranged to enable supervision of the nutritional balance of a user**

**FIELD OF THE INVENTION AND PRIOR ART TECHNIQUE**

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The invention relates to a device which is arranged to enable supervision of the nutritional balance of a user, wherein the device is arranged to calculate said nutritional balance by means of information related to at least one body measure of the user, the ingested nutritional quantity of the user and the physical activity of the user.

Nutrition means in this application substances which are ingested through food or drink, and also the energy contained in said substances. Such substances may be fat, proteins, carbohydrates, vitamins of different kinds, minerals and other to the body necessary substances, as, for example, water. It is essentially the nutritional balance related to energy, which is of interest during slimming.

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For persons trying to lose weight or keep the weight at a favourable level to the body, it is necessary to have control of the quantity and sort of substances, which are ingested through the food and drink and preferably the energy quantity supplied by these substances. When trying to lose weight, a person must take care to reduce his or her energy ingestion, but should at the same time eat such a nutritious fare that substances necessary to the body are supplied in a sufficient quantity. Another important component, when trying to lose weight, is the physical activity during which the combustion of energy increases significantly.

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In order to enable a person by oneself to keep a check on his or her nutritional balance, the person is required to estimate the quantity and the sort of ingested food and drink as well as to calculate its content of nutritional substances and energy.

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Furthermore, the person has to estimate how much energy has been consumed the by physical activity. This is difficult and requires a lot of calculating work and time, at the same time as the estimation of consumed energy by physical activity of the user probably will be very summary.

EP 409231 shows a computerised device, which is arranged to calculate the nutritional balance of a user. The device comprises a plurality of memory units. The first memory unit, which stores data related to the nutritional content in different foodstuffs and a second memory unit, which stores values related to in which quantities different nutritional substances needs to be supplied to an individual. These quantities are dependent on sex, age, body-shape and activity of the individual. Furthermore, it comprises a third memory unit, which stores values related to the ingested quantity of different types of foodstuffs. The device comprises also an input unit arranged to enable the input of different data related to the physical activity of the user and type and the ingested quantity of foodstuffs. Furthermore, the device comprises a display, which shows the ingested quantity of different nutritional substances. It is also mentioned in this document, that the device may store data related to ECG, blood pressure, lung-capacity and the like. However, how these data are determined does not appear and it does not appear either how the values related to the body's combustion by physical activity may be determined.

Other computerised devices for measuring the nutritional ingestion of a user are previously known by US 4,686,624, WO93/07570 and US 4,924,389. By these devices no values are determined which may form the basis for reliable calculations related to the physical activity of the user.

## SUMMARY OF THE INVENTION

5 The object of the present invention is to provide a device which is easy to use and carry around, at the same time as it enable a reliable supervision of the nutritional balance of a user. Furthermore, it should always be able to give the user information about the actual nutritional balance for the moment.

10 This object is achieved by the initially mentioned device, which characterised in that it comprises a measuring unit which is arranged to enable measuring of at least one parameter related to the physical activity of the user and that the device is arranged to calculate and inform the user of the actual  
15 nutritional balance at a desired point of time. By measuring a parameter related to the physical activity of the user and combine the value of this parameter with at least one body measure of the user, which may be the users weight, a relatively accurate calculation of the energy consumed by the user during  
20 his or her physical activity is possible. Thereby, the device may relatively accurately determine the actual nutritional balance, related to, for example, energy, by comparing the ingested quantity of energy with the consumed quantity of energy, for example, by physical activity. Thereby, a user trying to reduce  
25 his or her weight may in a simple and uncomplicated way obtain a nearly complete control of the nutritional balance and may thus in good time attend if the real nutritional ingestion is higher or lower than a planed ingestion. By hard physical activity the user may, according to the invention, get a fairly exact  
30 information about how much more energy he has consumed than planed, wherein he may allow an additional food ingestion without the risk to put on weight.

35 According to a preferred embodiment of the invention, the measuring unit is arranged to enable an essentially continuous measuring of said parameter. Thereby, the measuring unit may

in an objective way determine a total parameter value for all types of physical activities appearing during e g, for twenty-four hours, wherein consideration is taken to both planned jogging-rounds and more ordinary work, which otherwise may be very difficult to consider. Furthermore, the invention enables one for each moment exact calculation of the nutritional balance, which may aid the user, for example, to decide how much food and drink which may be ingested at an occasion without changing the nutritional balance appreciably.

According to a preferred embodiment of the invention, said parameter may comprise the pulse frequency of the user. By measuring the pulse frequency of the user a very good estimation of the users physical activity is obtained since the pulse frequency is a parameter increasing in relation to the grade of physical activity. Alternatively, said parameter may comprise the blood pressure of the user. In order to obtain accurate values of the physical activity of the user, both the pulse frequency and the blood pressure may be measured. A measuring unit measuring pulse frequency and/or blood pressure may be provided at the wrist of the user. Such a measuring unit may be attached around the wrist by means of a band or the like, wherein the measuring unit may have an appearance essentially corresponding to a conventional wristwatch.

According to another preferred embodiment of the invention, it comprises a first unit comprising a processing unit and a second unit comprising said measuring unit, as well as, means arranged to transmit a signal related to a value of said parameter from the second unit to the first unit. The second unit comprising the measuring unit may, as mentioned above, be attachable at the wrist of the user. The first unit, which is arranged to process and calculate said nutritional balance may, e g, be placed in a pocket of an article of clothing of the user. Thereby, the device may comprise transmitting means arranged to transmit said

signal wirelessly from the second unit to the first unit. Thereby, the measuring unit may comprise a transmitter since the processing unit comprises a receiver for receiving of the transmitted signal. Preferably, said transmitting between said  
5 units is wireless, which has the advantage that the device is easy to carry around. Alternatively, at a less expensive variant of the invention, said transmitting may be provided by a conduit.

According to another preferred embodiment of the invention, the  
10 first unit comprises a memory unit. Thereby, such a memory unit may be arranged to store relevant information, which is necessary to the calculation of the nutritional balance and other information, which may be of interest to the user. The memory unit may be arranged to store received values of said parameter  
15 from the measuring unit related to the physical activity of the user. Since the measuring unit measures said parameter continuously, the memory unit may be arranged to store received values continuously. Preferably, the memory unit is also arranged to store information related to body measures of  
20 the user. Such body measures may be the weight, height, sex and age of the user, i.e. such information as together with, for example, the pulse frequency of the user may form the basis for calculation of combusted energy of the user. Said memory unit may also be arranged to store information related to desired  
25 nutritional quantity, which ought to be supplied to the user. Depending on how fast the user wants to lose weight he may here state a desired value of energy which ought to be supplied to the user by the food. Furthermore, the quantity of nutritional substance in form of, e g, vitamins, minerals and other to the  
30 body essential substances, such as water, which ought to be supplied during a time period, may here be noted. The device may be arranged to inform when the user has not ingested, for example, a sufficient quantity of water during 24 hours. An alarm device may provide this. Furthermore, the memory unit may be  
35 arranged to contain information about the nutritional content in different foodstuffs. The user may benefit from such an

information when information is needed about the nutritional content in a particular foodstuff. This may occur, for example, when the user must decide if it is suitable to consume a certain foodstuff in light of the actual nutritional balance. Preferably, the processing unit is, at each ingestion of nutrition in form of food or drink, arranged to receive information related to sort and ingested quantity of this food or drink and, based thereon, calculate a value related to ingested nutritional quantity and store it in the memory unit. Consequently, the user needs only to input information related to the sort of food or drink and the ingested quantity, whereafter the device calculates values related to ingested quantity of energy and values related to ingested quantity of to the body necessary substances.

According to another preferred embodiment of the invention, the first unit comprises a display member, which enable the display of the actual nutritional balance. By such a display member, the user may be informed of actual values related to said nutritional balance by numerals or graphs. Preferably, the display member may be arranged to show different types of information as the user may elect between. Such elected information may be stored as alternative menus. Such a first menu may display the actual nutritional balance. Other menus may contain information about the nutritional content in food and drinks, information about the body measures of the user, the physical activity of the user, the objects of the user and a weekly guide etc. In addition, the device may comprise an input member for the input of said information. Such an input member may comprise a plurality of depressable buttons.

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## BRIEF DESCRIPTION OF THE DRAWINGS

In the following is described as an example a preferred embodiment of the invention with reference to the attached drawings, in which:

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- Fig 1 shows a device, according to the present invention, which comprises a first unit comprising a processing unit and a second unit comprising a measuring unit.
- Fig 2 shows schematically included parts of the device according to Fig 1.

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## DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

- 10 In Fig 1 shows a device according to the present invention. The device comprises a first unit 1 arranged to i.e. calculate the nutritional balance of a user and a second unit 2 arranged to measure a parameter related to the physical activity of the user. The second unit 2 comprises a measuring unit 3, which, according to an embodiment, is arranged to detect the pulse frequency of the user. The measuring unit 3 is attached by means of a strap around a wrist of the user. The circumference of the strap 4 may be adjustable to suit users of different size. The measuring unit 3 is ought to abut the inner side of the wrist with a suitable pressure so that it may detect the pulse of the user. The measuring unit 3 is arranged to measure the pulse frequency of the user continuously. The measuring unit 3 comprises a transmitter, which transmits a signal wirelessly, which is related to the pulse frequency of the user, to the first unit 1. The first unit 1 comprises a first 5 portion and a second portion 6, which are articulately provided in relation to each other. The first portion 5 and the second portion 6 may be foldable against each other to constitute an essentially compact, closed body which is suitable to keep in, for example, a pocket in an article of clothing worn by the user. When the user wish information about the actual nutritional balance, the portions 5, 6 are folded out. Thereby, a display member in form of an viewer screen 7 is visible and access is obtained to the button members 8-12, which enables for the user to control the information displaced on the viewer screen 7 and input
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- 25
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information that, for example, is necessary for the calculation of the nutritional balance of the user.

In Fig 2 shows schematically how the included parts, by the embodiment of the invention according to Fig 1, are related in relation to each other. The second unit 2 is here shown in form of a dashed square and comprise the above mentioned collapsible portions 5, 6, which comprise a viewer screen 7, button members 8-12, a processing unit 12 and a memory unit 13. The processing unit 12, which may comprise a micro controller MCU, is arranged to perform among other things calculations in order to inform the user of the actual nutritional balance. The memory unit 13 has the task to store information necessary to said calculations and offer information of different kinds, which may aid or be of interest to the user.

When the user will use the device, according to present invention, actively, the portions 5, 6 of the unit 1 are initially provided in one from each other folded out position, so that access is obtained to the button members 8-12 and the viewing screen 7. The viewing screen 7 may have such a construction that it automatically switches on when the portions 5, 6 are folded out or it may be activated by means of a button intended therefor. Initially, the viewing screen 7 shows a main menu with a plurality of electable submenus. Such menus may be the actual nutritional balance, the body measures of the user, physical activity, own aims and a food and drink guide etc. Thereby, the button 8 may be signed with "up" and the button 9 with "down" and be used for displacing upwards and downwards in said main-menu. Thereafter, the elected menu is activated by a button 10 signed with "enter". The button 11 is signed with "escape" and is used to confirm elections and for returning to the main menu. The buttons 12 a-d may be designed in different colours, for examples, the button 12a may be green, 12b yellow, 12c red and 12d blue. These buttons 12 a-d lead to information related to different types of foodstuffs. The green button 12a is

provided for information related to vegetables and fruits, the yellow button 12b to milk, meat and bread, the red button 12c to other kinds of foodstuffs whereas the blue button 12d is for water.

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When the device is used for the first time, the user goes to the menu with the designation body measures. There, the user inputs information related to his or her own body measures which may comprise information related to weight, height, sex and age. Thereafter, this information is stored in the memory unit 13. Thereafter, the user may mark the menu designated own aims and input information related to, for examples, desired energy ingestion and desired quantity of nutritional substances as vitamins, mineral substances and water, which ought to be ingested during 24 hours. Alternatively, the processing unit 12 may calculate the necessary ingestion of these nutritional substances in light of the input values related to body measures of the user. This information is also stored in the memory unit 13. Thereafter, the user attach the measuring unit 3, by means of the strap 4, at one of his or her wrists, in such a way that the measuring unit 3 abut the inside of the wrist with a suitable pressure, so it may measure the pulse frequency and/or the blood pressure of the user. Thereafter, the measuring unit 3 measures the pulse frequency and/or the blood pressure essentially continuously and transmit continuously measured values to the processing unit 12, whereafter these values are stored in the memory unit 13, direct or after a conversion in the processing unit 12. Consequently, the pulse frequency is a parameter which is related to the physical activity of the user, in such a way that a high physical activity results in a corresponding high pulse frequency with a high consumption of energy of the user. The user has to input information related to the kind of ingested food and/or drink, and the quantity into the device after each ingestion of nutrition in form of food or drink. If vegetables or fruits are ingested, the green button 12a is depressed whereafter ingested sort and quantity of vegetables

or fruits is marked. Thereafter, the button 10 "enter" is depressed whereafter the processing unit 12 converts said ingested quantity of food to values related to ingested quantity of energy, ingested quantity of vitamins, ingested quantity of mineral substances, ingested quantity of water and other for the body necessary substances. Thereafter, these values are stored in the memory unit 13. If milk, meat or bread is ingested the yellow button 12b is depressed whereafter a corresponding input procedure with sort and quantity of food or drink is marked and is finished in that the "enter" button 10 is depressed. These values are stored in a corresponding way in the memory unit 13. If foodstuffs have ingested, which are listed on the special list, the red button is depressed whereafter a corresponding input according to the above follows. Finally, the blue button may be depressed and the ingested water quantity is marked and stored in the memory unit 13.

At a desired point of time, the user may now control his actual nutritional balance by marking this menu of the main menu. Wherein the actual nutritional balance is shown in form of numericals or graphs. The device may also comprise, for example, an alarm device, which is arranged to attend the user about if he not has ingested an enough quantity of a necessary substance during a time period. This may occur, if the user not has drunk enough water during 24 hours or if he has eaten such an one sided fair that one or more for the body necessary nutritional substances has ingested in a too small quantity. Consequently, the user obtain by the device, according to the present invention, a complete control over his nutritional balance, which facilitates and may for many be a condition for reaching a successful result in form of a reduced weight.

The present invention is not in any way restricted to the described embodiment but may be varied in the scope of the claims. For example, the possibility exists to use other parameters than the pulse frequency and the blood pressure of

the user for measuring the physical activity of the user, as, for example the body temperature of the user. Likewise, the measuring unit 13 may be attached to other places on the body of the user than at the wrist. Furthermore, the possibility exists  
5 that the first unit may be constituted of a stationary computer placed in the home environment of the user and which receives signals from the measuring unit. Alternatively, said button members, for the input of information, may here be placed at the  
10 measuring unit 3 or be constituted of a keyboard of the computer.

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Claims

1. A device arranged to enable supervision of the nutritional balance of a user, wherein the device is arranged to calculate  
5 said nutritional balance by means of information related to at least one body measure of the user, the ingested nutritional quantity of the user and the physical activity of the user, characterised in that it comprises a measuring unit (3) which is arranged to enable measuring of at least one parameter related  
10 to the physical activity of the user and in that the device is arranged to calculate and inform the user of the actual nutritional balance at a desired point of time.
2. A device according to claim 1, characterised in that the  
15 measuring unit (3) is arranged to enable an essentially continuous measuring of said parameter.
3. A device according to claim 1 or 2, characterised in that said  
20 parameter comprises the pulse frequency of the user.
4. A device according to any one of the preceding claims, characterised in that said parameter comprises the blood pressure of the user.
- 25 5. A device according to any one of the preceding claims, characterised in that the measuring unit (3) is arranged to be provided at the wrist of the user.
- 30 6. A device according to any one of the preceding claims, characterised in that it comprises a first unit (1) comprising a processing unit (12) and a second unit (2) comprising said measuring unit (3) and in that it comprises means arranged to transmit a signal related to a value of said parameter from the second unit (2) to the first unit (1).

7. A device according to claim 6, characterised in that said transmitting means is arranged to transmit said signal wirelessly.
- 5 8. A device according to any one of the preceding claims, characterised in that the first unit (1) comprises a memory unit (13).
- 10 9. A device according to claim 8, characterised in that the memory unit (13) is arranged to store received values of said parameter from the measuring unit (3), which are related to the physical activity of the user.
- 15 10. A device according to claim 8 or 9, characterised in that the memory unit (13) is arranged to store information related to the body measures of the user.
- 20 11. A device according to any one of the claims 8 to 10, characterised in that the memory unit (13) is arranged to store information related to desired nutrition quantity, which ought to be supplied to the user.
- 25 12. A device according to any one of the claims 8 to 11, characterised in that the memory unit (13) is arranged to contain information about the nutritional content in different foodstuffs.
- 30 13. A device according to any one of the claims 8 to 12, characterised in that the memory unit (13) is arranged to contain information about the nutritional content in different foodstuffs, in that the processing unit (12) is arranged to receive information related to the sort and the ingested quantity of this food or drink during each ingest of nutrition in form of food or drink and, based thereon, calculate a value related to the ingested nutritional quantity and store it in the memory unit (13).
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14. A device according to any one of the preceding claims, characterised in that the first unit comprises a display member (7) enabling the display of the actual nutritional balance.
- 5 15. A device according to claim 6 and 14, characterised in that the processing unit (12) is arranged to show elected information on said display member (7).
- 10 16. A device according to claim 8, 9 or 12, characterised in that the second unit (2) comprises input members (8-12) for the input of said information.



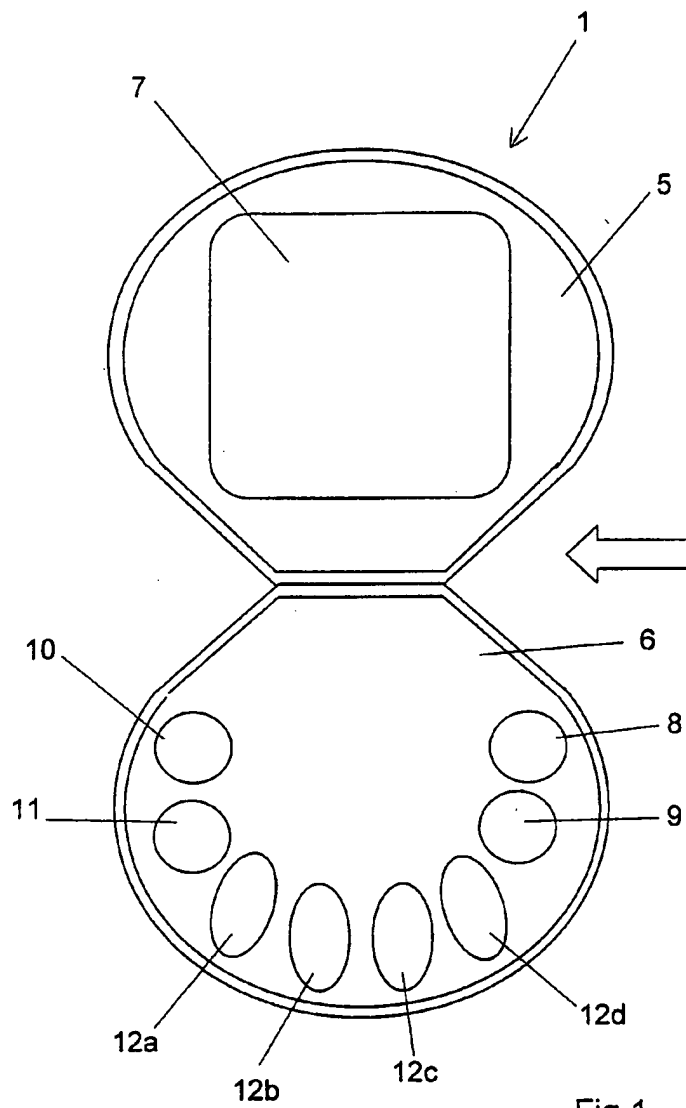
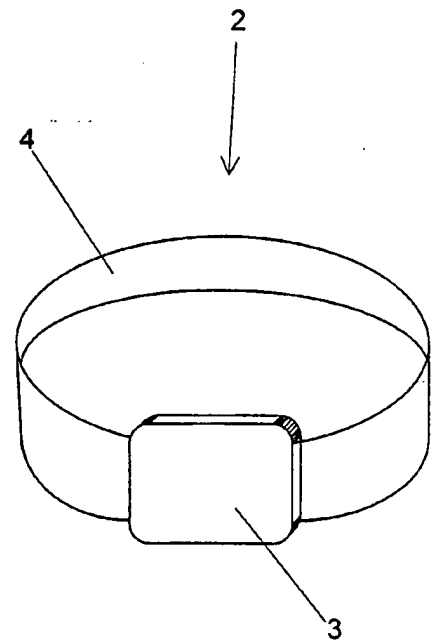


Fig 1



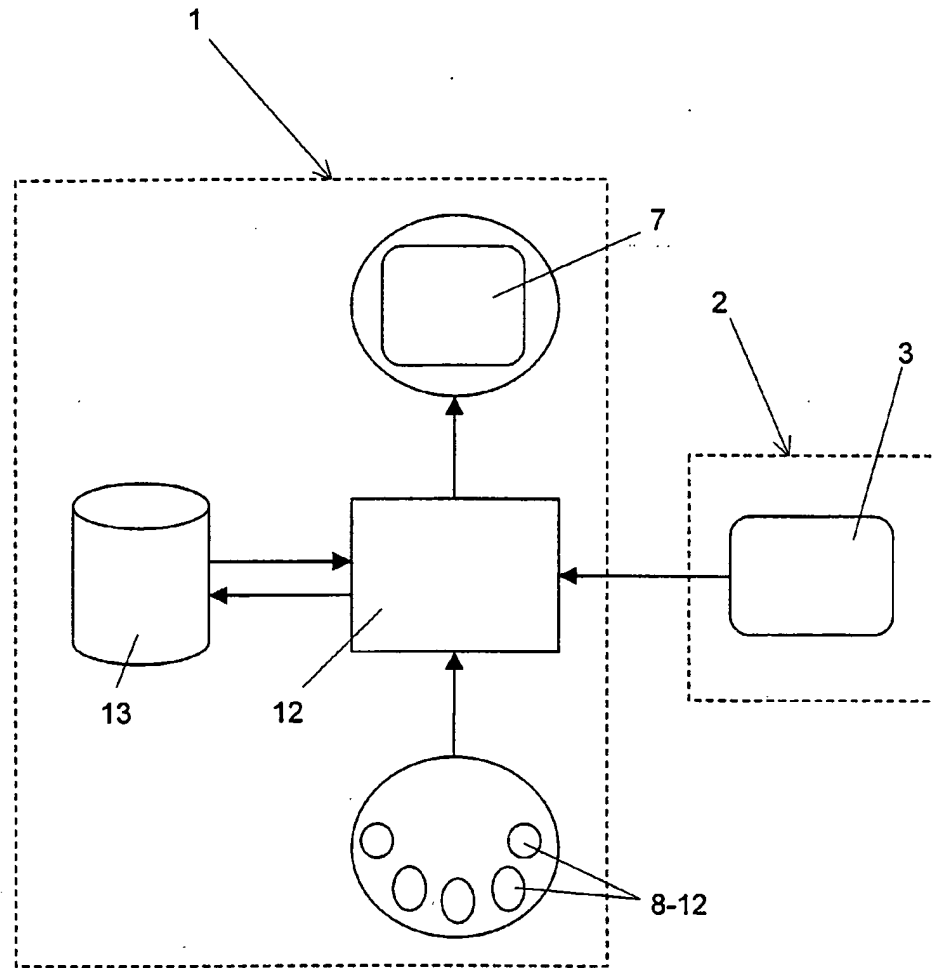


Fig 2

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/02017

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61B 5/00, G06F 19/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61B, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 5890128 A (H.B. DIAZ ET AL.), 30 March 1999 (30.03.99), column 5, line 53 - column 7, line 50 --	1-16
P,A	DE 19742153 A1 (SIEMENS AG), 8 April 1999 (08.04.99), figure 1, abstract --	1-16
P,A	US 5839901 A (K.M. KARKANEN), 24 November 1998 (24.11.98), figure 15, abstract -- -----	1-16

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/SE 99/02017**

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	5890128	A	30/03/99	NONE	
DE	19742153	A1	08/04/99	NONE	
US	5839901	A	24/11/98	AU 9495598 A WO 9916512 A	23/04/99 08/04/99